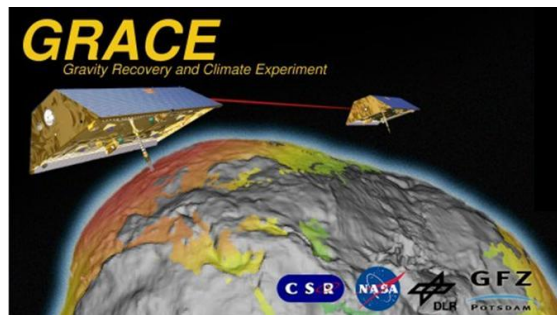


# GRACE Science Data System Monthly Report

## March 2010



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### Highlights:

- CSR has generated and delivered RL04 Level-2 products for February 2010.
- GFZ has generated unconstrained degree 60 and degree 120 solutions for January 2010. Further information can be found in the GFZ L2 Release Notes and in the February 2010 Newsletter.

### Satellite Science Relevant Events:

- Operations in Science Mode throughout the month except for the periods highlighted in the L1B Data Processing section below.
- The GRACE-1 Brouwer mean orbital elements on April 1, 2010 00:00:00 are as follows:  
A [m]      =      6836956.287  
E [-]      =      0.001775  
I [°]      =      89.017539
- The satellites separation was 220 km on April 1, 2010 with a rate of -0.70 km/d. Orbit maintenance maneuver won't be needed for some months.

### Level-0 raw data dump reception statistics at DLR ground stations Weilheim and Neustrelitz:

GRACE-A Housekeeping:	100.0 %	GRACE-B Housekeeping:	100.0 %
GRACE-A Science:	100.0 %	GRACE-B Science:	100.0 %

## Level-1 Data Processing:

- Level-1B Release 01 instrument data have been processed at JPL and archived at GRACE-ISDC and JPL PO.DAAC. Please refer to the statistics below.

- Notes:

- On 2010-03-17 at 21:43:30 GRACE-A experienced a Disconnect Supplementary Heater Lines (DSHL) event due to a weak battery cell. As a consequence the ACC heaters were disabled which resulted in an ACC bias change of the linear and angular accelerations. After the heaters are enabled the biases return back asymptotically to their values prior to the DSHL event.
- On 2010-03-18 at 18:03:10 another DSHL event occurred on GRACE-A which resulted in a slow down of the spacecraft heat up to avoid another DSHL event. The GRACE-A ACC1B data during this reheating period can not be used in the nominal gravity field determination process and should not be included. The ACC bias values returned to their nominal values on 2010-03-26 00:00:00
- For 2010-03-19 see note 2010-03-17. The GRACE-B ACC stopped producing telemetry after a commanded GRACE-B IPU reboot at 08:48:46. A power cycle of the GRACE-B ACC restored nominal operations at 20:08:10. In total 11 hours and 23 minutes of ACC1B was lost
- For 2010-03-20 till 2010-03-25 see note 2010-03-17

- **KBR statistics:**

A) KBR1B product name

B) Total arc length with data (hours)

C) Number of observations used in residual calculation

D) KBR-GPS range residual RMS (cm)

E) minimum KBR-GPS range residual (cm)

F) maximum KBR-GPS range residual (cm)

G) number of continuous segments in the KBR product

A	B	C	D	E	F	G
KBR1B_2010-03-01_X_01.dat	24.0	17280	0.37	-1.4	1.1	1
KBR1B_2010-03-02_X_01.dat	24.0	17280	0.29	-1.1	0.9	1
KBR1B_2010-03-03_X_01.dat	24.0	17280	0.44	-1.9	1.5	1
KBR1B_2010-03-04_X_01.dat	24.0	17280	0.34	-1.0	1.0	1
KBR1B_2010-03-05_X_01.dat	24.0	17280	0.40	-0.8	1.9	1
KBR1B_2010-03-06_X_01.dat	24.0	17280	0.36	-0.8	2.0	1

KBR1B_2010-03-07_X_01.dat	24.0	17280	0.55	-3.6	1.0	1
KBR1B_2010-03-08_X_01.dat	24.0	17280	0.43	-1.2	1.9	1
KBR1B_2010-03-09_X_01.dat	24.0	17280	0.41	-1.9	1.0	1
KBR1B_2010-03-10_X_01.dat	24.0	17280	0.31	-1.1	0.9	1
KBR1B_2010-03-11_X_01.dat	24.0	17280	0.31	-1.2	1.1	1
KBR1B_2010-03-12_X_01.dat	24.0	17280	0.42	-2.1	0.9	1
KBR1B_2010-03-13_X_01.dat	24.0	17280	0.30	-1.2	1.0	1
KBR1B_2010-03-14_X_01.dat	24.0	17280	0.48	-2.3	1.0	1
KBR1B_2010-03-15_X_01.dat	24.0	17280	0.35	-1.1	1.1	1
KBR1B_2010-03-16_X_01.dat	24.0	17280	0.48	-1.5	2.4	1
KBR1B_2010-03-17_X_01.dat	24.0	17280	0.48	-1.5	2.4	1
KBR1B_2010-03-18_X_01.dat	24.0	17280	0.36	-1.4	1.1	1
KBR1B_2010-03-19_X_01.dat	23.6	16990	0.90	-5.3	2.0	3
KBR1B_2010-03-20_X_01.dat	23.6	16976	0.47	-1.9	1.1	3
KBR1B_2010-03-21_X_01.dat	24.0	17280	0.53	-2.7	1.4	1
KBR1B_2010-03-22_X_01.dat	24.0	17280	0.32	-1.0	1.0	1
KBR1B_2010-03-23_X_01.dat	24.0	17280	0.38	-1.4	1.3	1
KBR1B_2010-03-24_X_01.dat	24.0	17280	0.42	-1.4	1.9	1
KBR1B_2010-03-25_X_01.dat	24.0	17280	0.62	-2.4	3.2	1
KBR1B_2010-03-26_X_01.dat	24.0	17258	0.31	-1.2	1.2	2
KBR1B_2010-03-27_X_01.dat	24.0	17280	0.34	-1.6	0.9	1
KBR1B_2010-03-28_X_01.dat	24.0	17257	0.31	-1.4	1.3	2
KBR1B_2010-03-29_X_01.dat	24.0	17280	0.33	-1.3	0.9	1
KBR1B_2010-03-30_X_01.dat	24.0	17280	0.29	-0.9	1.1	1
KBR1B_2010-03-31_X_01.dat	24.0	17280	0.37	-1.8	1.0	1

- Following JPL RL00 (yellow) and RL01 (green) L1B products are publicly available. June and July 2002 (red) are not provided due to accelerometer problems.

[illegible]

- The software to convert from GRACE GPS1x format to Rinex format has been updated to handle the presence of data from PRN32 since Feb. 26, 2008. Users should download and re-install the entire Level-1 Read software suite (RELEASE\_2008-03-20) from the GRACE archives. This software is backwards compatible and can process all mission data.
- L1B De-aliasing Products Status (for details see AOD1B Product Description Document):
  - Release 01: Generation has been stopped June 30, 2007.
  - Release 03: Generation has been stopped January 31, 2007.
  - Release 04: Generated until April 9, 2010 and extended to 1976-2000 (see newsletter for December 2008).
  - Quality statistics for Release 04 products are online available at <http://www-app2.gfz-potsdam.de/pb1/op/grace/results> (follow link “GRACE Atmosphere and Ocean De-aliasing Statistics”).
  - Following AOD1B products are publicly available (yellow: RL01, RL03 and RL04; green: RL01 and RL04, blue: RL04 only):

AOD1B	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1976												
...												
1999												
2000												
2001												
2002												
2003												
2004												
2005												
2006												
2007												
2008												
2009												
2010												

## Level-2 Product Generation and Distribution:

- Besides historical CSR RL01, GFZ RL03 and JPL RL02 time-series (see below) and more experimental releases which are only available to the GRACE Science Team the following RL04 L2 products are presently available to the public (green: available, yellow: in preparation; red: missing due to accelerometer data problems):
  - **GFZ:** GSM solutions are available for August 2002 until January 2010. July 2004 until October 2004 and December 2006 are also available as constrained solutions (\*GK2-\*, reason is GRACE 4d repeat orbit and GPS anomaly on GRACE-B, respectively). October 2008 until January 2010 are also available as unconstrained solutions up to degree and

order 60 (\*GM60\*, reason is GRACE 7d repeat orbit). Corresponding background GAA, GAB, GAC and GAD products and calibrated errors (GSM\*.txt) have been provided too. Details are listed in the GFZ L2 Release Notes.

GFZ RL04	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2002												
2003												
2004							GK2	GK2	GK2	GK2		
2005												
2006												GK2
2007												
2008										M60	M60	M60
2009	M60	M60	M60	M60	M60	M60	M60	M60	M60	M60	M60	M60
2010	M60											

- **CSR:** GSM solutions along with the GAC and GAD background model files and calibrated errors (GSM\*.txt) are available for the period April 2002 until February 2010. Details are listed in the CSR L2 Release Notes.

CSR RL04	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2002												
2003												
2004												
2005												
2006												
2007												
2008												
2009												
2010												

- **JPL:** GSM version 4.1 labeled “\*JPLEM\_0001\_0004” along with the GAA, GAB, GAC and GAD background model files and calibrated errors (GSM\*.txt) are available for the period April 2002 until February 2010. Details are listed in the JPL L2 Release Notes.

JPL RL04	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2002												
2003												
2004												
2005												
2006												
2007												
2008												
2009												
2010												

- GFZ has stopped RL03 processing (Feb 2003 until Jan 2007 available at the archives. For further details refer to the GFZ RL03 release notes for Level-2 products).

- CSR has stopped RL01 processing. (Apr. 2002 until Dec 2006 available at the archives. For further details refer to the CSR RL01 release notes for Level-2 products).
- JPL has stopped RL02 processing (January 2003 until November 2005 available at the archives. For further details refer to the JPL RL02 release notes for Level-2 products).
- TN05 containing C20 estimates derived from SLR and using GRACE RL04 standards is periodically updated.

#### **Miscellaneous:**

- Next GRACE Science Team Meeting will take place at GFZ in Potsdam on 11/12 November 2010!
- The following acknowledgement shall be added to any new GRACE related publication (paper, poster etc.): *Acknowledgement: We would like to thank the German Space Operations Center (GSOC) of the German Aerospace Center (DLR) for providing continuously and nearly 100% of the raw telemetry data of the twin GRACE satellites.*
- A list of GRACE related publications which can be sorted by author or date is available at [http://www.gfz-potsdam.de/pb1/op/grace/index\\_GRACE.html](http://www.gfz-potsdam.de/pb1/op/grace/index_GRACE.html) under item “Publications” (current status: 452 papers). This list is regularly updated and maybe incomplete. If you are missing a publication please send an e-mail to Frank Flechtner (flechtne@gfz-potsdam.de).
- Science data users are encouraged to submit citations of their own and other works related with GRACE to the bibliography web page implemented at PO.DAAC: <http://podaac.jpl.nasa.gov/grace/bibliography.html>.